J. W. Mackay

GREENWICH HOSPITAL SCHOOLS.

RETURN to an Order of the Honourable The House of Commons, dated 16 August 1848;—*for*,

A COPY "of REPORT of 1848 on GREENWICH HOSPITAL SCHOOLS, by Her Majesty's Inspector of Schools."

REPORT on the GREENWICH HOSPITAL SCHOOLS, by Her Majesty's Inspector of Schools, the Rev. *Henry Moseley*, M.A., F.R.S., Inst. Reg. Paris. Corresp.

TO THE RIGHT HONOURABLE THE LORDS COMMISSIONERS OF THE ADMIRALTY.

My Lords,

THE information I am about to lay before you in respect to the Greenwich Hospital Schools has been derived from the following sources:

First. Lists of the boys composing the schools supplied to me at Christmas 1847 and Midsummer 1848, wherein is specified the age of each boy, the time of his residence in the institution, the time of his continuance in his present class, and the estimate formed of his talents and character by the master of that class.

Secondly. Statements of the subjects of instruction in the several classes, and of the time allotted to each subject.

Thirdly. A statement given by each master of the attainments of his class in respect to the various subjects taught in it.

Fourthly. The answers given by the boys in writing to the printed questions I proposed to them, supplying specimens of their writing, spelling, arithmetical, grammatical and geographical knowledge, and of their mathematical and nautical attainments.

I have appended copies of these questions to my Report. The answers are written in copy-books, of which one is reserved for the use of each boy, so that the same book contains the similar answers which he has returned at different successive examinations, and constitutes a record of his progress.*

Fifthly. The results which I have recorded of *vivâ voce* examinations at Christmas and Midsummer of the boys.

Sixthly. The reports which the drill-masters are accustomed to make to the Lieutenant-superintendent of such cases of misconduct as occur out of school-hours, and on which are recorded the punishments awarded by the Lieutenant, in consideration of such misconduct.

Seventhly. A statement of the punishments inflicted for misconduct during school-hours by the head masters of the several schools, and of the cause of such punishment so inflicted.

From these documents, and from similar returns before made to me, I have compiled the following Table, in which you will find recorded those statistical details which supply the most certain evidence of the existing state of the institution and of its progress.

GREENWICH

* I have enclosed one of these copy-books from each of the schools. Your Lordships, by turning over the pages of these books, will be enabled to judge of the progress of the boys by whom they were written, from the time they first entered the school.

REPORT OF INSPECTION FOR 1848 OF

GREENWICH HOSPITAL SCHOOLS.

	1842.	1843.		1844.		1845.		1846.		1847.		1848.	
	Christmas.	Midsummer.	Christmas.	Midsummer.	Christmas.	Midsummer.	Christmas.	Midsummer.	Christmas.	Midsummer.	Christmas.	Midsummer.	Christmas.
NUMBER OF BOYS:													
Number of boys in the Nautical School	110	109	126	141	152	171	173	160	162	146	155	146	
Upper School	270	247	251	208	223	210	210	208	233	239	229	229	
Lower School	388	389	385	381	377	388	388	390	401	387	405	379	
Number who have left the Upper School	- -	- -	49	- 112	-	- 115	-	- 133	-	- 114	-	58	
Number who have left the Lower School	- -	- -	58	- 122	-	- 121	-	- 126	-	- 84	-	31	
NUMBER WHO HAVE GONE TO SEA:													
Number of boys admitted into Her Majesty's Navy	- -	- -	- 20	- -	- 28	- -	- 61	- -	- 85	- -	- 62	-	
Number of boys admitted into the Merchant's service	- -	- -	- 49	- -	- 54	- -	- 103	- -	- 51	- -	- 28	-	
Total number who went to sea	- -	- -	- 69	- -	- 82	- -	- 164	- -	- 136	- -	- 90	-	
HEALTH:													
Average number of boys in the Infirmary	21	- 13	- -	15	- -	19	- -	10	- -	14	- -	16	-
Number of deaths	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- 3	-	
DISCIPLINE:													
Number of punishments inflicted with the birch, in both Schools, for offences committed out of school-hours	69	35	38	9	9	13	25	- -	39	9	7	12	
Number of punishments inflicted otherwise than with the birch	51	48	18	4	6	3	- -	- -	3	8	7	12	
Number of punishments inflicted for offences committed during school-hours in the Upper School	- -	28	21	25	15	21	4	2	1	1	- -	1	
Number of punishments inflicted for offences committed during school-hours in the Lower School	- -	49	39	8	5	11	4	- -	- -	10	3	7	
Number per cent. of corporal punishments, with and without the birch, in the three schools	- -	21	15	$6\frac{1}{3}$	$4\frac{5}{7}$	$6\frac{1}{4}$	$4\frac{1}{3}$	- -	$5\frac{3}{7}$	$3\frac{3}{5}$	$2\frac{1}{6}$	$4\frac{1}{4}$	
Number of cases of absconding from the school	37	29	30	3	5	7	30	11	51	6	3	9	
Number of boys whose removal has been recommended, or who have been discharged for various offences included in the preceding numbers, but chiefly for evasion	13	17	7	1	4	2	13	- -	19	1	- -	3	
Number of punishments inflicted by means of written impositions in the Upper School	- -	- -	- -	- -	- -	717	176	133	63	79	15	45	
Number of punishments inflicted by means of written impositions in the Lower School	- -	- -	- -	- -	- -	423	19	- -	57	89	64	393	
Average attendance on the backward class in the Upper School	—	—	—	—	—	—	—	—	—	—	—	—	
Lower School	- -	- -	- -	- -	- -	33	48	38	47	46	47	56	
NUMBER OF TEACHERS:													
Number of masters constantly employed in the Schools	10	10	11	15	15	15	15	15	15	15	15	15	
Number of boys to each master in the Nautical School	55	54	42	35	38	* 42	43	40	40	36	38	36	
Upper School	90	80	62	52	55	52	52	52	58	47	45	45	
Lower School	78	78	77	54	54	55	55	56	56	55	44	62	
NAUTICAL ATTAINMENTS:													
Number of boys in the Upper School at the time of each examination, who were then within six months of the period when they must leave the institution	58	59	47	50	56	39	39	60	57	55	56	57	
Proportion per cent. of the above number who had acquired a competent knowledge of the mathematical principles and the practice of Navigation and Nautical Astronomy	22	27	30	36	43	51	31	40	40	44	46	50	
Proportion per cent. who had acquired no knowledge whatever of Navigation or Nautical Astronomy in theory or practice	40	31	30	10	—	—	—	—	—	—	—	—	
Proportion per cent. who had acquired a knowledge of Navigation and (in various degrees) the practice of Nautical Astronomy, but were imperfectly or not at all acquainted with the mathematical theory of the latter science	14	17	21	38	53	49	69	45	56	51	50	50	
Proportion per cent. who had acquired various degrees of knowledge in Navigation, but were ignorant of Nautical Astronomy in theory or practice	24	25	19	16	4	- -	- -	15	43	5	4	—	
Number of Astronomical Observations made and recorded by the boys of the Nautical School during the previous half-year	2,700	10,500	12,000	26,000	27,600	29,500	23,000	61,000	35,500	69,000	46,000	74,000	
Number of boys receiving daily instruction in the art of making Astronomical Observations	48	- -	53	100	90	171	173	160	162	146	155	146	
Number of Nautical Charts drawn	- -	- -	120	170	140	175	140	330	100	160	100	185	

Statistics

Statistics of the School.

The average number of boys in the Upper School (including the Nautical School) at the close of each half-year, from Christmas 1842 to Christmas 1845, was 374; and of those in the Lower School, 387. I know not how to account for the fact, that the one number is so much less than the other, and that the full complement of 400 boys is never reached in the Upper School, and rarely in the Lower.

387
374
761

In the Upper School, it is the more to be desired that the vacancies should be speedily and regularly filled up, and the full number completed, as by reason of that recent regulation which fixes the maximum age of admission at 11 instead of 10 years, the time of residence in that school is increased from three to four years, and the number of yearly vacancies diminished in the proportion of three to four.

The number of boys discharged from the school from Midsummer 1843 to Midsummer 1848, was 1,123; of whom 541 went to sea, 256 having entered Her Majesty's service, and 285 the merchant's service, being an average of 51 yearly to the one, and of 57 to the other service.

The number who, on leaving the school, sought occupations not connected with the sea service was 582. During the last year 90 boys went to sea, being less by one-fifth than the average number, and scarcely more than one-half of the number who went to sea in the year terminating Midsummer 1846, and seven-tenths of those who went to sea in the following year.

The equal numbers in which they are accustomed to enter the two services were not, moreover, this year observed, 62 having entered Her Majesty's service, and only 28 the merchant service.

Your Lordship's recent order to the effect that all the boys discharged from the Lower School shall be admitted into Her Majesty's service * will increase this disproportion. Of the boys who have entered Her Majesty's service, 19 were from the Upper School and 43 from the Lower; whilst of those who entered the merchant service, 27 were from the Upper and only one from the Lower. Three-fifths of the boys who have gone to sea, since my last Report, from the Upper School, appear, therefore, to have entered the merchant's service. In the year terminating at Midsummer 1847, the proportion was seven-tenths.

The number of boys who have gone to sea (in the two services), when they left the school, has varied remarkably from year to year. In the year terminating at Midsummer 1844 it was 69; in that terminating at Midsummer 1846, 164; and during the last year 90.

The Health of the Boys.

The average number of boys resident in the infirmary during the year terminating at Midsummer was 16, being greater than the average numbers similarly taken in 1843, 1844, 1846, 1847. There have been three deaths during the year. It would contribute to the health, not less than to the comfort of the boys, if the play-ground which, in winter, is constantly wet, were drained. Being on a slope, there can be no difficulty in effecting this, by the expedients used in draining land for agricultural purposes.

The Discipline of the School.

The following Table, collected from the drill-masters' reports, bears testimony to a decided improvement in the discipline of the boys out of school-hours.

TABLE

* An agreement, signed by the parents or guardians of every boy on entering the school, states that he shall be sent to sea, if a situation can be provided for him, when his education is completed.

TABLE of the NUMBER of CASES of MISCONDUCT out of School-hours reported to the Lieutenant-Superintendent by the Drill-masters.

Offences out of School Hours.	1846.		1847.		1848.	
	Midsummer.	Christmas.	Midsummer.	Christmas.	Midsummer.	Christmas.
Absconding - - -	11	51	6	3	9	
Insubordination and mischief	18	11	14	3	9	
Insolence - - - -	6	2	1	2	1	
Bad language - - -	3	2	- -	1	1	
Indecency - - - -	1	- -	3	2	5	
Theft - - - - - -	- -	2	5	2	2	
Intoxication - - -	6	- -	1	—	—	
Deception - - - -	- -	2	- -	-	1	
Outrageous violence - -	- -	1	3	—	—	
TOTAL number of cases reported - -	45	71	33	13	27	

The punishments inflicted in regard to the offences enumerated in this Table, and to similar ones of former years, are stated in the following Table:

—	1842.	1843.		1844.		1845.		1846.		1847.		1848.	
	Christmas.	Midsummer.	Christmas.	Midsummer.	Christmas.	Midsummer.	Christmas.	Midsummer.	Christmas.	Midsummer.	Christmas.	Midsummer.	Christmas.
Number of punishments inflicted with the birch for offences committed out of school-hours - -	69	35	38	9	9	13	25	–	39	9	7	12	
Number of punishments inflicted otherwise than with the birch - -	51	48	18	4	6	3	–	–	3	14	8	12	

Twelve cases of absconding have occurred during the two last half-years, being a less number than during any two preceding half-years, except those of the year 1844, and the same is true of the number (19) of corporal punishments in respect to offences out of school-hours.

The year 1844, so memorable in the history of the school for a reduction in the number of cases of evasion and of corporal punishments, was that in which the reading-rooms were opened, and libraries of entertaining books provided for the use of the boys, the time of going to bed in winter altered from half-past six or seven to nine o'clock, evening lectures commenced, causes of dissatisfaction and misunderstanding among the officers of the institution removed, the course of instruction enlarged, and greater efficiency given to it by the appointment of new masters. I have thought it important to record these facts, because they show the influence of moral considerations on the discipline of the schools, and justify the trouble taken, and the expense incurred by the Admiralty to remedy the evils under which they were at that time labouring.

In respect to the discipline of the schools during school-hours, I have but to repeat the favourable testimony which I have been enabled to record during the last four years. One corporal punishment only was inflicted in the Upper School of 229 boys during the year which terminated at Midsummer, and 10 only in the Lower School of 379 boys. The number of punishments by the weekly deprivation of a half holiday* has somewhat exceeded that in former years: it amounts to one in four of the Upper School, and to one in nine of the Lower.

* In the backward or Wednesday afternoon class.

Lower. The number of punishments by written impositions has been less than in former years in the Upper School, but more in the Lower.

Considering that the punishments I have recorded are all that have been found necessary to maintain amongst 770 boys, such as those who compose the Greenwich schools, that high state of discipline by which they are distinguished, and to give to their instruction that efficiency, the evidence of which I am about to lay before you, I think myself justified in expressing to your Lordships an opinion, that in this respect the state of the schools reflects the highest credit upon the masters under whose control the discipline is placed during school-hours, and upon the Lieutenant-Superintendent with whom it rests out of school-hours.

The Organization of the Schools.

The following Table shows the distribution of the boys through the different classes of the school, and specifies the number who have remained in each class longer than the average period of six months:

Midsummer 1848.

School - -	Nautical.			Upper.				Lower.				
Class - -	1.	2.	3.	1	2.	3.	4.	1.	2.	3.	4.	5.
Number of boys in the class	60	52	34	54	60	59	56	64	63	70	61	81
Number of boys who have been in the classes more than six months - -	28	14	16	13	15	13	-	43	34	29	8	54

The Nautical Attainments of the Boys.

The Nautical School consisted at Christmas of 155, and at Midsummer of 146 boys, who, having received in their progress through the Upper School instruction in religious knowledge, the elements of a good English education, and the principles of mathematics, devote the last year of their residence in the institution to the study of mathematical science in its application to Navigation and Nautical Astronomy, excepting only that period which is allotted to their religious instruction by the chaplain.

The Nautical School has three classes, of which the lowest is composed of those boys who in their progress through the Upper School have given evidence of such inaptitude or previous neglect, or such want of inclination or industry, as disqualify them to enter with success on that higher course of instruction which includes with a knowledge of the rules of nautical science a knowledge also of their principles. The studies of these boys are limited to the former. In the two other classes, geometry and algebra and plane and spherical trigonometry, with their applications to Marine Surveying, Navigation and Nautical Astronomy, are studied.

Of the boys, 56 in number, who at Midsummer were within six months of the time when they must leave the schools (15 years of age), and who may be taken to represent those who, during the last six months have left it, about one-half had attained to that higher degree of nautical skill which is implied in the union of all these subjects of instruction; being a greater proportion than at any previous examination.

Of the other half, a portion unite various degrees of skill in computation with less perfect mathematical attainments, and the knowledge of the remainder is limited to computation.

A reference to the Table at the commencement of this Report will show from the statistics of the Nautical School that the efficiency of that school has steadily advanced, and I have reason to believe that the general standard of mathematical attainment in it was never higher than at the present time.

This result has been brought about by an improvement in the instruction the boys receive before they enter the Nautical School (in the Upper School), and by the efficient manner in which the labours of Mr. E. Riddle, in the first class, are seconded by his son in the second.

I have great pleasure in bearing testimony to the efforts made by Mr. John Riddle to introduce modern and improved methods of mathematical instruction, and to the success which has attended them. He gives a constant and laborious attention to every thing which may contribute to simplify the processes of analytical reasoning on which the science of Nautical Astronomy depends.

It is only thus that a subject of so much mathematical difficulty can be brought within the compass of the intelligence of boys such as those who compose this school.

The lithographic press provided by the Admiralty for the use of the schools has greatly aided these labours.

The boys of the second class, with a few exceptions, have been well grounded in geometry, work equations of some difficulty correctly and well, generally know enough of plane trigonometry to find the cosine of an angle of a triangle in terms of the sides (and many are farther advanced); they compute by the aid of logarithms with considerable accuracy, write out mathematical operations neatly, and have correct ideas of popular Astronomy and of some important principles of Natural Philosophy.

The Third Class of the Nautical School.

No boy in the Greenwich Schools, however low in the scale of intelligence, or morally infirm, is lost sight of by their system, or neglected. It is in regard to children thus inferior in ability, or deficient in previous instruction or in character, that their greatest energies are put forth, and some of their highest results achieved. Of this fact, the third class of the Nautical School is an example; from what I have stated to your Lordships of the composition of that class, and of the peculiar functions assigned to it, it will be evident that there is none in the institution to the master of which a more difficult task is assigned; and it is a great satisfaction to me to be able to add that there is none which, for the objects contemplated by it, appears to me to be more efficiently conducted. I have the more pleasure in bearing this testimony, from the sense I entertain of the value of that careful, religious and moral teaching which Mr. Baillie has succeeded in uniting with a very efficient course of instruction in practical Navigation.

Astronomical Observations.

Every boy who enters the Upper School is taught in the Nautical School to observe with the sextant. More than 120,000 observations have been made and recorded during the last year, 98,000 in the two first classes of the Nautical School under the direction of Mr. E. Riddle, and 22,000 in the third class under the direction of Mr. Baillie.

This is a greater number than in any preceding year.

Charts.

The number of charts drawn during the year is 285. Among them are included charts of the two reaches of the river opposite to Greenwich, taken from actual survey.

The Class of Marine Surveying.

It was late in the season before the boats were got afloat for surveying, but the masters have since been out with the class whenever the weather permitted. I propose in my next Report to record, for your Lordships' information, more fully the results obtained in this class. It is, I think, desirable that every boy who goes out with the boat should note, on the spot, in a book provided for that purpose, the observations that are made; or, where that is impossible, that he should copy them from the notes so taken by others, and that each should construct a chart founded on the observations so recorded.

THE UPPER SCHOOL.

The Upper School contained at the period of my last inspection 229 boys, who are taught in four classes. The subjects of instruction in the first class include, with religious knowledge and the ordinary branches of an English education, the principles

principles of algebra, geometry, trigonometry, and the use of logarithms. The writing and spelling of the boys of this class has, I think, improved since my last inspection. The majority of them have worked a proposition of Euclid correctly. From the experience of this and former examinations, I am, however, disposed to doubt whether the symbolical method of demonstration used in the school is so suitable to the instruction of boys of the age of these, as the text of Euclid under its original form.

In algebra, they have done much better at this examination than in geometry, and in English grammar they have acquitted themselves well. Very few have been able to draw a map of Europe from memory correctly. Their notions of popular astronomy and of the various branches of experimental philosophy, which form the subject of their lectures, are vague and unsatisfactory. They read with ease and correctness, and understand fairly the subject-matter of their reading lessons.

The religious instruction they receive is of an eminently practical character, and it is impossible not to encourage a hope that labours so judicious and so zealous as those of the head-master in this important department of their instruction will not be without fruit.

The subjects of instruction in the second class are generally the same as in the first, but not so far advanced.

The spelling of the boys is pretty good, but their answers generally to the printed questions placed before them in arithmetic and algebra are not satisfactory. They have, however, done well in their oral examination, and particularly in Scriptural knowledge.

The creation of a fourth class in the Upper School has diminished the numbers of the third class. Of this class I have always had to make to your Lordships a favourable report. The boys appear to do their best, as well in their written as their oral examination. I have been much pleased with their reading, arithmetic and geographical knowledge.

They are well acquainted with the book of Genesis, but answered imperfectly in the Catechism; and more attention might with advantage be given to their spelling.

The fourth class of the Upper School has been in operation somewhat more than a year very beneficially for the institution, under the direction of Mr. Petty, formerly assistant master in the first class, whose services I have great satisfaction in being able to bring thus favourably under your Lordships' notice. He has established good order in a class, more difficult, probably, than any other to manage, from the fact of its receiving the boys on their first admission to the school; and nothing can be more satisfactory than the progress the boys have made under his care. I have been particularly pleased with the progress exhibited in their specimens of writing, and they answered extremely well in religious knowledge, in the principles of geography, and in some portions of English history.

Lower School.

The following were the subjects of religious instruction tendered for examination in the first class of the Lower School: The Pentateuch, the types and prophecies relating to the Messiah, the Gospels, the Acts of the Apostles, and the Epistles of the Romans and Corinthians.

The boys of this class have been taught to deduce from the Gospel narrative those moral admonitions it was intended to convey, and to make of scriptural truth that personal application without which the knowledge of it is of little value.

At my Christmas examination I found that all of them, except two, could read with ease and correctness in the fifth Irish Book.

I enclose to you specimens of their writing and spelling. One-half of them have read the principal propositions in the three first books of Euclid, and been exercised in examples and problems in simple equations. The remainder are in the first book of Euclid, and in the four rules of Algebra. Navigation and Nautical Astronomy have been added to their course of instruction since the date of my last Report.

In the constant and active supervision of so able and so experienced an astronomer as the Reverend G. Fisher, the chaplain, the Lower School enjoys, in respect to this department of its course of instruction, no common advantages. I confess, however, that I was not prepared for that precision and accuracy in computation, and that range of attainments in nautical science, of which the books before me afford the evidence. The success with which a new and difficult department of instruction of so much importance to the public service, in its connexion with these schools, has been pursued, appears to me to reflect great credit on the industry and ability of the head-master, Mr. Hughes, and on the enterprise and perseverance of the boys. Your Lordships having directed that sextants and chronometers should be provided for their use, they observe daily, and are accustomed to compute the latitude, the error of the chronometer, the variation of the compass, and the longitude, by lunar observations. They are, moreover, acquainted with "the sailings," and with the construction and use of Mercator's chart.

Whilst their knowledge of nautical science thus comprises all that is usually considered necessary for practical purposes, it is greatly and conspicuously inferior to that of the boys of the Upper School in this respect, that it does not include a knowledge of the mathematical principles on which the rules of that science are founded.

No class in the school appears to me, however, to be better acquainted with the principles of astronomy, or so clearly to understand the relation of phenomena of the heavens to their mechanism.

In mechanics, they are acquainted with the steam-engine in all its details; they know, moreover, the principles on which its action depends, and can make computations in respect to the amount of work which, under given conditions, it will yield. They have some knowledge of the principles of statics, and of their application to practical questions by the method of geometrical construction. In questions of this class I hope to find them more successful, however, at my next examination.

They have been well instructed in geography, and particularly in that of Europe and of the colonial empire of Great Britain.

The portion of English history tendered for examination included the period from the reign of George the Second to that of William the Fourth. I much regretted that the time occupied by other subjects of examination left me none for this, in which they are accustomed to acquit themselves so well.

The second class has, under the care of Mr. Purcell, attained an efficiency second (for the objects so contemplated by it) to that of no other in the institution; and I have the more pleasure in bringing this fact under your Lordships' notice, as on some previous occasions I have not been able to record so favourable an impression. The class has been well taught the elements of Scripture knowledge and the practical duties of religion on the basis of the Catechism. There has been of late years a great improvement in the writing of the classes below the first in the Lower School, and the second particularly affords the evidence of it.

The physical geography of Europe has been specially attended to. In arithmetic one-half of the boys have advanced to proportion, and some of these to fractions. In mechanics they solve elementary questions in the theory of work, and are well acquainted with the mechanism of the stationary engine. The entire class has advanced as far as division in algebra, and a few of the boys work simple equations. About two-thirds of them know 20 propositions and the remaining third ten propositions of Euclid.

I can record a very favourable impression of the progress made in the third class in reading and writing. More attention to subjects calculated to exercise the intelligence of the children is, however, desirable in this class.

In respect to the fourth class, I have the same favourable report to make as heretofore.

The fifth class is that hitherto known as the reading class. During the last half-year, Mr. Connon has been appointed by your Lordships to the office of master of it. If that gentleman's duties continue to be discharged with the same vigour and efficiency with which he has entered upon them, his influence cannot but be felt in raising the general standard of intelligence in the Lower School, not less than in that difficult task which has been more particularly assigned to him, of teaching boys to read whose ignorance, strengthened by neglect during the 12 years which have preceded their admission to the schools, is stubborn, and

and whose minds, so long unaccustomed to bend themselves to learning, have become rigid.

I am truly happy to be able to record a more favourable impression in regard to the reading of the school, generally, than heretofore. The following Table contains an abstract of the result of my inquiries in respect to it at four successive examinations. The progress made, more particularly in the fifth class, during the last half-year, would have been rendered apparent, if my other duties had allowed me to make a subdivision of the numbers included in the last column:—

TIME of EXAMINATION.	Class.	Number in Class.	Could read with Ease and Correctness in the Fifth Irish Book.		Could read tolerably in the Fourth Irish Book, but not with perfect Ease and Correctness.		Had acquired different Degrees of Proficiency in Reading, but all read imperfectly.	
			Number in each Class.	Number per Cent. in the School.	Number in each Class.	Number per Cent. in the School.	Number in each Class.	Number per Cent. in the School.
Midsummer 1846	1	106	72	35	29	33	5	32
	2	112	40		47		20	
	3	114	22		51		41	
	4	58	4		4		50	
Midsummer 1847	1	76	66	325	6	43	- -	20
	2	75	55		16		2	
	3	89	5		65		17	
	4	78	6		46		24	
	5	69	5		38		23	
Christmas - 1847	1	71	61	30	2	37	1	26
	2	78	39		31		4	
	3	91	15		54		32	
	4	76	8		49		16	
	5	89	- -		13		51	
Midsummer 1848	1	64	64	38	- -	34	- -	27
	2	63	59		3		- -	
	3	70	18		50		- -	
	4	61	- -		51		6	
	5	33	- -		22		9	
	6	88	- -		2		85	

No Educational Test for Admission to the Lower School.

The fact that no previous education is required of the boys admitted to the Lower School, operates not only unfavourably for the interests of the school, but of the boys themselves, in this respect,—that the parents are accustomed to consider it unnecessary to see that their children are taught any thing before they go to Greenwich, because afterwards they will be so well taught; and thus to neglect their own duty the more, as they estimate the efficiency of the Greenwich Schools higher.* It is probable, indeed, that the school thus entails upon some of the children an amount of early neglect, the effects of which it cannot afterwards overcome; and that it brings upon such children as are disappointed of obtaining admission to it, a state of ignorance in after-life to which they would not otherwise have been subjected.

Considering that the means of education are now everywhere provided on terms which place it within the reach of every parent really desirous to secure it for his children, it would not, I think, be unreasonable to require that every boy admitted to the Lower School should be able to read in the Bible.

Imperfect Ventilation of the Reading-room.

The desks placed in the reading-room of the Lower School during the last half-year, by your Lordships' order, adapt it to its present use, as far as that is practicable.

* Some of the boys, when asked why their parents have neglected to send them to school, have answered, that they saw no use in it, because they knew they would have plenty of schooling at Greenwich.

practicable. I cannot, however, but record the impression, that the state of the ventilation, and the light in that room, not less than the want of height and space, interfere with the instruction of the children, and cannot but be prejudicial to their health.

The Evening Lectures.

I have at this examination, for the first time, proposed to the boys a series of questions on the lectures delivered to them in the evening. I regret to have to record that their answers to these questions have fallen short of my expectations. I propose at all my future examinations to set them similar questions, and I hope to be able to report to you more favourably in respect to them.

In concluding this Report, I am desirous to bear testimony to the sense I entertain of the zeal and ability which the masters bring to discharge their several duties.

At no previous period have I been able to report more favourably of the success of their labours.

I have, &c.

Privy Council Office, 19 July 1848. (signed) *Henry Moseley.*

APPENDIX.

EXAMINATION PAPERS, MIDSUMMER 1848.

NAUTICAL SCHOOL.

(*One Question only is to be answered in each Section.*)

Section I.

1. In a right-angled triangle, the square of the side subtending the right angle is equal to the sum of the squares of the sides containing it.
2. If a straight line touches a circle, and from the point of contact a straight line be drawn cutting the circle, the angle made between the straight line which cuts the circle and that which touches it, shall be equal to the angle in the alternate segment of the circle.
3. If a solid angle be contained by three plane angles, any two of these are, together, greater than the third.

Section II.

Solve one of the equations:—

1. $$\frac{2(4x+3)}{x-1} + \frac{2x-3}{2x-2} = 10.$$

2. $$\left.\begin{array}{l} 2x + 3y = 118. \\ 5x^2 - 7y^2 = 4333. \end{array}\right\}$$

3. $$\left.\begin{array}{l} \frac{1}{x} + \frac{1}{y} = \frac{1}{a} \\ \frac{1}{x} + \frac{1}{z} = \frac{1}{b} \\ \frac{1}{y} + \frac{1}{z} = \frac{1}{c} \end{array}\right\}$$

Section III.

1. A farmer buys a flock of sheep at 20 *s.* each, and having kept them until the expenses incurred upon them amount to 10 *l.*, during which time he had lost 10 of them, he finds they have cost him 30 *s.* each. How many were there in the flock?
2. There are 20 boys in a class, each of whom is to have a copy of the same book. Some of the books are to be bound, and the rest unbound; and the binding of each volume cost 1 *s.* 6 *d.* It is determined to spend 1 *l.* 16 *s.* on each set. Of how many books will the bound set consist, and what will be the cost of each bound volume?

SECTION IV.

Prove one of the following formulæ of Plane Trigonometry :—

1. $\frac{a}{b} = \frac{\text{Sin A}}{\text{Sin B}}$.

2. $\text{Cos}\,(A + B) = \text{Cos A Cos B} - \text{Sin A Sin B}$.

3. $\text{Cos B} - \text{Cos A} = 2\,\text{Sin}\,\frac{1}{2}\,(A + B)\,\text{Sin}\,\frac{1}{2}\,(A - B)$.

4. $\text{Sin A} = \frac{2\sqrt{S\,(S-a)\,(S-b)\,(S-c)}}{b\,c}$.

SECTION V.

Prove one of the following formulæ of Spherical Trigonometry :—

1. $\text{Cos}\,a = \text{Cos}\,b\,\text{Cos}\,c + \text{Sin}\,b\,\text{Sin}\,c\,\text{Cos A}$.

2. $\text{Sin}\,\frac{A}{2} = \sqrt{\text{Sin}\,(S-b)\,\text{Sin}\,(S-c)\,\text{Cosec}\,b\,\text{Cosec}\,c}$.

3. Show how one side of a spherical triangle may be determined, having given the two other sides and the included angle.

SECTION VI.

1. Investigate a formula for determining the dip of the horizon.
2. Show how the latitude is determined by the method of double altitude.
3. Investigate a formula for computing the equation of equal altitudes.

NAUTICAL SCHOOL.

(One Question only is to be answered in each Section.)

SECTION I.

1. How have the dimensions of the Earth been found ?
2. What would be the effect upon the Earth's temperature if its axis coincided with the plane of its orbit ; and what if it were perpendicular to it ?
3. On what causes does the variation of the brightness of the planet Venus depend ?

SECTION II.

1. The base of an isosceles triangle is 500 feet, and the vertical angle 33° ; find the sides.
2. To determine the distance of a ship at anchor at C, I measured a straight line A B = 1,000 yards along the shore, and observed the angles C A B = 32° 10′, and C B A = 83° 10′; required the distance of the ship from A.
3. The angle of elevation of a tower, 100 feet high, due north of an observer, was 50°; what will be its elevation after walking due east 300 feet ?

SECTION III.

1. A ship sails S. W. b. S. 24 miles, N.N.W. 57 miles ; S. E. b. E. ½ E. 84 miles, and S. 35 miles ; find the course and distance made good by construction.
2. A ship sails N.N.E. 11 miles ; N.E. ¾ E. 39 miles ; E. ½ N. 14 miles ; W. 19 miles ; N.N.W. 4 miles ; required the course and distance made good by computation.
3. A ship from Lat. 38° 20′ S., and Long. 31° 15′ W., sails S. 40° E., 170 miles by account, when she is found to be in Lat. 40° 54′·5 S., and Long. 30° 44′·8 W. ; find the current.

SECTION IV.

1. Explain what is meant by Middle Latitude Sailing, and show Rad : diff. long. : : Cos mid. lat. : dep.
2. Explain what is meant by the meridional difference in Mercator's sailing, and show that if M. be the meridional difference of Latitude, L the difference of Longitude, and C the course, then $\tan C = \frac{L}{M}$.
3. Find the course on the great circle between St. Helena and Cape Horn.

SECTION V.

1. July 4, 1842, Long. 101° E. ; obs. mer. alt. Sun's lower limb. 81° 59′ N., ind. corr. 0, height of eye 16 feet ; required the Latitude.

2. Aug. 5, 1826, Lat. by acc., 47° N., Long. by acc., 25° W., at 11m. 48s. A.M. obtained true alt. of Sun's centre, 63° 54′ S.; required the Latitude.

3. Dec. 23, 1825, Lat. by acc., 8° S., obs. true altitudes of Sun's centre 74° 16′ A.M., and 74° 16′ P.M., with interval of 36m. 37s. Reduced declination 23° 27′ S.; required the Latitude.

UPPER SCHOOL.—FIRST CLASS.

A sentence will be read to you, which you must write out, with a careful attention to the penmanship and spelling.

1. Parse the words printed in Italics in the following Sentence:—
   "*European mariners dread* the rocky *islands* in the Chinese *sea*."
2. Correct the following sentence, and give grammatical reasons for the corrections you make.
   "Him and me goes home together."
3. Draw a map of Europe, showing its principal rivers.
4. Show from the courses of the rivers of Europe where its high lands must chiefly be situated.
5. Write out in the order of their succession the names of the Sovereigns of England.
6. Reduce to their simplest terms $\frac{621}{738}$ and $\frac{5\frac{2}{3}}{3\frac{9}{10}}$.
7. Find the value, in hours and minutes, of $\frac{9}{11}$ of a day.
8. Find the value of ·3125 of a guinea.
9. Find the value of $\frac{\sqrt{2}+1}{\sqrt{2}-1}$ to four places of decimals.

UPPER SCHOOL.—SECOND CLASS.

A sentence will be read to you, which you must write out with a careful attention to the spelling and penmanship.

(*One Question only is to be answered in each Section.*)

Section I.

1. Reduce $\frac{56}{63}$ and $\frac{68040}{72576}$ to their lowest terms.
2. Add together $\frac{3}{8}, \frac{5}{12}$, and $\frac{4}{9}$.
3. Reduce $\frac{9}{11}$ of $\frac{5}{8}$ of $\frac{22}{25}$ to its equivalent simple fraction.

Section II.

1. Of what sum is $7\frac{1}{2}$*d.* two-thirds?
2. A piece of cloth containing $25\frac{1}{2}$ yards costs 3*l.* 11*s.* $2\frac{1}{2}$*d.*; what is that per yard?
3. A carriage-wheel revolves 4 times in going 13 yards; how often will it revolve in going $2\frac{1}{2}$ miles?

Section III.

1. From a given point, to draw a straight line equal to a given straight line.
2. If two angles of a triangle be equal to one another, the sides also which subtend or are opposite to the equal angles, shall be equal.
3. The greater side of every triangle is opposite to, or subtends, the greater angle.

Section IV.

1. Find the value of $\frac{4z^2}{2-x} + \frac{3y^2}{2+x}$ when $x = 3, y = 4, z = 5$.
2. From $x^3 - 4x^2 + 8x - 6$ subtract $\frac{x^3}{3} + x^2 - x + \frac{1}{2}$.
3. Multiply $1 - x$ by $x - 4x^2$.

Section V.

1. Divide $a^6 - x^6$ by $a^2 - x^2$.
2. Solve the equation $\frac{x}{5} + \frac{x}{3} = \frac{x}{2} + 1$.
3. A father left his two sons 1,000 *l.* To the younger he gave half of what he gave to the elder, and 10 *l.* more; what had each?

Section VI.

Draw a Map of Asia.

UPPER

UPPER SCHOOL.—THIRD CLASS.

A sentence will be read to you, which you must write out with a careful attention to the spelling and penmanship.

(One Question only is to be answered in each Section.)

Section I.

1. Write down in figures the number one hundred thousand and ten, and subtract from it ten thousand and ten.
2. From what number must I subtract 12,659 to leave 57,094?
3. Multiply 37,908 by 35,821.
4. Divide 944,146,875 by 875.

Section II.

1. If two men earn 30 *s.* in 3 days, what will one man earn in a day?
2. A. offers to give B. an apple for two pears; how many apples can B. have by giving A. 52 pears?

Section III.

1. What is the price of 279 cwts. at 3 *l.* 7 *s.* 10¼ *d.* per cwt.?
2. How much a day is 860 *l.* 0 *s.* 7½ *d.* a year?

Section IV.

1. Two vessels are 70 miles apart, and sailing towards one another; one sails at the rate of 8 miles an hour, and meets the other after sailing 40 miles; at what rate per hour did the other sail?
2. What is the carriage of 5 hhds. of sugar, each 4 cwts. 3 qrs. 21 lbs., at 12 *s.* 6 *d.* per ton?

Section V.

Draw a Map of the Eastern Hemisphere.

LOWER SCHOOL.

A sentence will be read to you, which you must write down with a careful attention to the spelling and the penmanship.

(One Question only is to be answered in each Section by the Boys of the First Class. Those of the Second Class may answer any of the Questions.)

Section I.

1. A man bought an ox for 7 guineas, and gave 2 guineas to have it fed 3 months; he then sold it for 11 guineas; how much did he gain by the transaction?
2. An oak which grows 6 inches every year is of the same height as a fir 24 years old which has grown 10 inches every year; what is the age of the oak?
3. How many persons can receive 17 *s.* 4 *d.* each out of 12 *l.* 3 *s.* 4 *d.*?
4. A person whose income is 430 *l.* a year spends 18 *s.* 5½ *d.* a day; how much does he lay by at the year's end?

Section II.

1. If 12 men can do a piece of work in 15 days, how many men will do it in 9 days?
2. Find the amount of 350 guineas in 4½ years at 3¾ per cent.
3. What is the value of $\frac{2}{3}$ of 117, and what is the number of which 15 is $\frac{5}{6}$ths.
4. Reduce $\frac{8\frac{3}{4}}{9\frac{3}{4}}$ to a simple fraction.
5. Reduce $\frac{2\frac{1}{4}-1\frac{1}{3}}{2\frac{1}{3}+1\frac{1}{4}}$ to a simple fraction.
6. If $\frac{2}{3}$ of a shilling buy $\frac{1}{4}$ of a gallon, how many gallons will $\frac{3}{5}$ of a shilling buy?

Section III.

1. Multiply x^2+3x-2 by $x+3$.
2. Divide x^2+6x+5 by $x+1$.
3. Reduce to a single fraction $\frac{a-b}{a+b}+\frac{ab}{a^2-b^2}$.

SECTION IV.

Solve the equations:—

1. $\frac{x}{2}-\frac{x}{3}+\frac{x}{4}=2-\frac{x}{6}+\frac{5x}{12}$.

2. $\frac{6x+13}{15}-\frac{3x+5}{5x-25}=\frac{2x}{5}$.

3. $\sqrt{1+\sqrt{x}}=1-\sqrt{1-\sqrt{x}}$.

SECTION V.

1. If two triangles have three sides of the one respectively equal to three sides of the other, each to each, the triangles are equal, and the angles are equal which are opposite to the equal sides.
2. To make a triangle whose sides shall be equal to three given straight lines.
3. To find the centre of a given circle.

SECTION VI.

1. Find by logarithms the value of $\frac{1\cdot563\times2\cdot345}{\sqrt{9\cdot357}}$.
2. Two of the sides of a triangle are 214 and 191 feet respectively, and the angle opposite to the former is 41° 19′ 15″; what is the third side?
3. From the top of the mast of a ship, 95 feet above the water, the angle of depression of another ship's hull was 9°; what was the distance of the ships?

ROYAL NAVAL SCHOOLS, GREENWICH HOSPITAL.

LOWER SCHOOL.—FIRST CLASS.

(One Question only to be answered in each Section.)

SECTION I.

1. Sailed from latitude 52° 20′ N., longitude 14° 38′ W., upon the following true courses: E.S.E. 43 miles, S.W. 32 miles, S.E. b. S. 58 miles; find latitude and longitude of place arrived at, and course and distance sailed.
2. Prove the rule in middle-latitude sailing, Difference of latitude: difference of longitude:: cosine of middle latitude: tangent of the course. Find the course and distance from Lisbon to Bermuda by this method, and also by Mercator's sailing.
3. Course E. b. S. ½ S. by compass. Variation 2¼ points easterly. Lee-way ¾ point. Ship on the starboard tack; find the course made good.

SECTION II.

1. On the 24th December, at New York, observed $\underline{\underline{\odot}}$ 51° 11′ 50″ at noon. Index error + 1′ 10″. The Sun's declination from the Nautical Almanack was 23° 26′ 34″ S. and semi-diameter 16′ 18″; required the latitude.
2. In a high northern latitude, the double meridian altitude of Castor by an artificial horizon was 112° 11′ 20″ N. Index error -- 0′ 40″. The Star's declination 32° 16′ 15″; required the latitude.
3. On the 24th May 1848, P.M., at sea, in latitude 36° 44′ 30″ N., by a mean of several observations, the observed altitude of the ⊙'s lower limb at $3^h\ 53^m\ 16^s$, by chronometer, was 23° 11′ 20″; height of the eye, 33 feet; index error, + 1′ 30″. The chronometer on the 30th April previous was fast of mean time at Greenwich $19^m\ 21^s$, gaining daily 1″; required the longitude; the ⊙'s declination, &c., to be taken from the Nautical Almanack.

SECTION III.

1. On the 13th June 1848, at $9^h\ 44^m$ observed $\overline{\overline{☽}}$ 48° 25′ 10″ on the meridian near London. Index error — 2′ 35″; required the latitude.
2. At Singapore, latitude 1° 17′ 30″ N., at $3^h\ 32^m\ 39^s$, P.M., apparent time, the ⊙'s centre bore by compass N. 292° 9′ E. The ⊙'s declination was 18° 33′ 50″ N.; required the variation.
3. At 10^h, A.M., on the 9th September 1847, at Greenwich, in latitude 51° 29′ N., the ⊙'s centre bore N. 159° 10′ E., and at the same time $\underline{\underline{\odot}}$ 71° 51′ 0″; index error, — 50″; required the variation.

SECTION

SECTION IV.

1. Give some explanation of the nature of the corrections for Dip, Refraction, Horizontal Parallax, in Altitude, Correction for Latitude to the Moon's equatorial Horizontal Parallax; Moon's Augmentation.
2. Show how to construct a Mercator's Chart, and explain the advantage of this construction over others for the general purposes of Navigation. Explain also what is meant by "Great Circle Sailing," and the cases in which it may be used with advantage.
3. On the 21st May 1847, at $4^h\ 43^m\ 12^s$ by chronometer,

Apparent alt. ☉'s centre 26° 46′ 0″ True alt. ☉'s centre 26° 44′ 17″
,, ☽ ,, 44 46 0 ,, ☽ ,, 45 23 48
Apparent distance of centres 86° 7′ 8″
Chronometer slow, mean time at place $2^m\ 32^s$. Find the longitude.

ROYAL NAVAL SCHOOLS, GREENWICH HOSPITAL.

LECTURES.

(One Question only is to be answered in each Section.)

SECTION I.

1. What happens to a ray of light coming from water into air? What experiment illustrates this? Will the ray pass through the surface of the water at whatever angle it is incident upon it?
2. On what principle is it, and by what experiment, that the different coloured rays which compose white light can be separated?
3. Describe and explain the construction of the astronomical telescope. Why must the focus of the eye glass coincide with that of the object glass? Why do we see distant objects more clearly with the telescope than with the naked eye?

SECTION II.

1. How may a bar of hard steel be converted into a magnet?
2. What is meant by induced magnetism? Is such induced magnetism ever produced in the iron of a ship, and by what cause? Has any expedient been adopted to neutralize its effect on the compass; and what?

SECTION III.

1. If a bar magnet were suspended from its centre of gravity by a fine thread, would it remain in a horizontal position? If not, would it incline equally in all places?
2. What is meant by magnetic variation? Is it the same at all places, and at all times? Mention some of those places where it is the greatest, and where the least.
3. What is an electro-magnet? How is it made? How may it be made to lose its magnetic properties instantaneously? How has it been applied in the electric telegraph?

SECTION IV.

1. How may oxygen gas be obtained, and what are its properties?
2. What are the component elements of water? How may hydrogen gas be obtained from it? What becomes of the oxygen of the water in this experiment, and what of the acid?
3. Write down all you know about carbon. What has it to do with respiration and the combustion of fuel?

SECTION V.

1. A man capable of lifting 200 lbs. wishes to raise a ton weight by means of a crow-bar five feet long. Where must the weight bear upon it, the fulcrum being at one end and the man lifting at the other?
2. Describe any one of the different systems of pulleys, and show what is the relation between the power and weight?
3. A barge 30 feet long, 8 feet wide, and whose sides are 4 feet high, weighs, when out of the water, 5 tons. How many tons lading will sink her?

SECTION VI.

1. Describe and explain any experiments you have seen made with the air-pump.
2. Write down all you know about the barometer.
3. What is the use of the condenser in the steam-engine? How much pressure would be gained on every square inch of the piston by the use of the condenser if the condensation were perfect? How many horse's power does this amount to in an engine whose piston has an area of 330 square inches, and a stroke of five feet, when making 20 strokes per minute?

SECTION VII.

1. What must be the length of the stroke of the piston of an engine whose area is 1,000 square inches, that, making 20 strokes per minute under a mean effective pressure of [illegible] lbs. the square inch, it may yield 10 horse power?
2. State fully the principle of the parallelogram of pressures, and describe the experiment by which it may be proved.
3. A platform 10 feet long is supported in a horizontal position by a chain fixed to its extremity and to a point five feet above the hinge on which the other extremity of the axis turns; find the tension produced upon the chain by a ton suspended from the extremity of the platform, and the direction and amount of the pressure upon the hinge.

SECTION VIII.

1. How is it known that the earth's surface is not a plane as it seems to be, and how is it known that its shape is nearly that of a sphere, and that it turns round?
2. What is the cause of the tides,—of some tides being higher than others,—and of the times of high water being different on successive days?
3. Why do not eclipses occur every month? Why do similar eclipses return every 19 years? How often would they return if there were no regression of the moon's nodes?

GREENWICH HOSPITAL SCHOOLS.

COPY of REPORT of 1848 on GREENWICH HOSPITAL SCHOOLS, by Her Majesty's Inspector of Schools.

(Mr. Cowper.)

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